REMARKS

I. INTRODUCTION

Claims 1-44 are pending in the present application. Applicants respectfully request reconsideration of the subject patent application in view of the following remarks.

II. INFORMATION DISCLOSURE STATEMENT

The U.S. patent applications listed in the Information Disclosure Statement filed on June 24, 2002 have not been considered as the Examiner has indicated that copies thereof are not in the file. The Examiner has indicated that it is unclear whether these applications were filed but not scanned into the file, or if they were not filed. As indicated in the Information Disclosure Statement filed on June 24, 2002, copies of these applications were enclosed with the modified PTO-1449 form. As the Examiner has requested copies of these patent applications for the file, Applicants have attached hereto copies of such patent applications for the Examiner's consideration. Applicants respectfully request that these patent applications be expressly considered during the prosecution of the present patent application, and that such consideration be noted by the Examiner (on the previously submitted PTO-1449 form or on a PTO-892 form). The Applicants are also submitting an IDS including 3 patents that have issued based on the previously cited applications.

III. CLAIM REJECTIONS UNDER 35 U.S.C. § 102(e)

Claims 1-3, 7-11, 17-21 and 27-31 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,696,177 ("Hatwar"). For at least the following reasons, Applicants respectfully submit that these rejections should be withdrawn.

To anticipate a claim under 35 U.S.C. § 102, a reference must disclose each and every element of the claimed invention. *Verdergaal Bros. v. Union Oil Co. of Cal.*, 814 F.2d 628, 2 USPQ2d 1051 (Fed. Cir. 1987).

Hatwar is directed to white organic electroluminescent devices with improved stability and efficiency. Hatwar discloses "an organic light-emitting diode device which produce[s] substantially white light, comprising: a) a substrate; b) an anode disposed over the substrate; c) a hole transport layer doped with a rubrene compound for emitting light in the yellow region of the spectrum; d) a light-emitting layer doped with a blue light-emitting compound, disposed directly on the hole transport layer; e) an electron transport layer doped with a rubrene compound for emitting light in the yellow region of the spectrum and disposed directly over the blue light-emitting layer; and f) a cathode disposed over the electron transport layer." Hatwar, column 2, lines 41-56.

In contrast to the teachings of Hatwar, the organic light emitting device of the present invention, as currently recited in independent claims 1, 9 and 19, includes a "hole transporting layer ... doped with a *phosphorescent* material," and an "electron transporting

layer ... doped with the *phosphorescent* material" (emphasis added). As described in the present specification, "the term 'phosphorescence' refers to emission from a triplet excited state of an organic molecule and the term 'fluorescence' refers to emission from a singlet excited state of an organic molecule." Specification, page 2, lines 6-8.

Although the Examiner has alleged that figures 9 and 10 of Hatwar discloses an organic light emitting device including a hole transporting layer doped with a phosphorescent material and an electron transporting layer doped with the phosphorescent material, Applicants respectfully disagree. Figures 9 and 10 of Hatwar disclose an OLED having rubrene doped in both the hole transport layer and the electron transport layer. *See* Hatwar, column 14, lines 19-21; column 15, lines 14-23. However, rubrene is a well-known fluorescent compound, not a phosphorescent compound. In fact, in U.S. Patent No. 6,614,175 ("Aziz *et al.*"), which the Examiner has cited in the following obviousness rejection, Aziz *et al.* states that "[e]xamples of the fused ring *fluorescent* dyes include perylene, rubrene, anthracene, coronene, phenanthrecene, pyrene and the like ..." (emphasis added). Aziz *et al.*, column 19, lines 6-8.

Thus, for at least the preceding reasons, it is respectfully submitted that Hatwar does not anticipate the claimed invention as it does not disclose nor suggest each and every element of the invention as presently claimed in independent claims 1, 9 and 19, as well as dependent claims 2-3, 7-8, 10-11, 17-18, 20-21 and 27-31 therefrom. Therefore,

Applicants respectfully request that the rejection of these claims under 35 U.S.C. § 102 be withdrawn.

IV. CLAIM REJECTIONS UNDER 35 U.S.C. § 103(a)

Claims 12, 13, 22 and 23 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Hatwar. Claims 4-6, 14-16, 24-26 and 32-44 also stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Hatwar as applied to claims 1, 9 and 19 above, and further in view of Aziz *et al*. For at least the following reasons, Applicants respectfully submit that these rejections should be withdrawn.

In order for a claim to be rejected for obviousness under 35 U.S.C. § 103(a), not only must the prior art teach or suggest each element of the claim, but the prior art must also suggest combining the elements in the manner contemplated by the claim. *See Northern Telecom, Inc. v. Datapoint Corp.*, 908 F. 2d 931, 934 (Fed. Cir. 1990), *cert. denied* 111 S.Ct. 296 (1990); *In re Bond*, 910 F. 2d 831, 834 (Fed. Cir. 1990). The Examiner bears the initial burden of establishing a *prima facie* case of obviousness. *See* M.P.E.P. §2142. To establish a *prima facie* case of obviousness, the Examiner must show, *inter alia*, that there is some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify or combine the references, that when so modified or combined, the prior art teaches or suggests all of the claim limitations, and that there is a reasonable expectation of success. *See* M.P.E.P. §2143. Applicants respectfully submit that the Examiner has not established a *prima facie* case of obviousness.

As described above, Hatwar discloses an OLED having rubrene, a fluorescent compound, doped in both a hole transport layer and an electron transport layer. However, as also described above, Hatwar does not teach nor suggest an OLED including a hole transporting layer doped with a phosphorescent material and an electron transporting layer doped with the phosphorescent material, as is currently claimed in independent claims 1, 9, 19 and 32, and dependent claims 4-6, 12-16, 22-26 and 33-44 therefrom. Thus, Hatwar does not teach nor suggest each of the claim limitations of any of these claims. Therefore, Applicants respectfully submit that the rejection of claims 12-13 and 22-23 as being obvious over Hatwar has been overcome, and should therefore be withdrawn.

Regarding the rejection of claims 4-6, 14-16, 24-26 and 32-44 as being obvious over Hatwar in view of Aziz *et al.*, Aziz *et al.* is directed to organic light emitting devices. Aziz *et al.* discloses "[a]n organic light emitting device which contains a mixed region of a hole transport, an electron transport, and an organic luminescent component.... Further, the device contains a hole transport region situated between the mixed region and an anode electrode, and an electron transport layer situated between the mixed region and a cathode electrode." Aziz *et al.*, abstract. The device disclosed in Aziz *et al.* includes "a mixed region comprising a mixture of a hole transport material and an electron transport material, and wherein this mixed region comprises an organic luminescent material." Aziz *et al.*, column 4, lines 17-20. Aziz *et al.* further discloses that "[a] preferred class of dopant materials that can be utilized in the mixed region 15, 25, 35, and 45 is the phosphorescent materials, such as, for example, organometallic compounds containing a heavy metal atom

that lead to strong spin-orbit coupling, such as those disclosed in Baldo *et al.*, 'Highly efficient organic phosphorescent emission from organic electroluminescent devices,' Letters to Nature, Volume 395, pp 151-154 (1998)." Aziz *et al.*, column 19, lines 32-40.

Since Hatwar is directed to fluorescent dopants while Aziz *et al.* discloses phosphorescent dopants, there is no motivation to combine these two patents in an attempt to arrive at the Applicants' presently claimed invention. That is, as described in the present specification on pages 2-3, whereas fluorescent emission refers to emission from a singlet excited state of an organic molecule, phosphorescent emission refers to emission from a triplet excited state of an organic molecule. Furthermore, an advantage of phosphorescent emission is that all excitons (formed by the recombination of holes and electrons in an emission layer), which are formed either as a singlet or triplet excited state, may participate in luminescence. This is because the lowest singlet excited state of an organic molecule is typically at a slightly higher energy than the lowest triplet excited state. This means that, for typical phosphorescent organometallic compounds, the lowest singlet excited state may rapidly decay to the lowest triplet excited state from which the phosphorescence is produced. In contrast, only a small percentage (about 25%) of excitons in fluorescent devices are capable of producing the fluorescent luminescence that is obtained from a singlet excited state. Thus, the emission mechanisms for fluorescent and phosphorescent emission are different, and one of ordinary skill in the art would not necessarily expect such emitters to behave similarly in terms of their emission characteristics. For example, as discussed in U.S.

Patent No. 6,097,147 by Baldo *et al.* (which was cited by the Patent Office in the October 8, 2003 Office Action):

> In comparison to fluorescent devices, however, phosphorescent devices have several potential drawbacks that must be overcome to produce useful electroluminescence. For example, energy transfer is relatively slow, as long range dipole-dipole coupling (Förster transfer) is forbidden by spin conservation. Efficiency also decreases rapidly with current density, long phosphorescent lifetimes which cause saturation of emissive sites, and triplet-triplet annihilation. In addition, triplet diffusion lengths are typically long (e.g., >1400 Å) compared with typical singlet diffusion lengths of about 200 Å. Thus, if phosphorescent devices are to achieve their potential, device structures need to be optimized for triplet properties.

Baldo *et al.*, column 2, lines 1-13.

Applicants respectfully submit that there is no teaching, suggestion nor motivation for one of ordinary skill in the art to modify the teaching of Hatwar by replacing the flourescent dopants disclosed therein with the phosphorescent dopants disclosed in Aziz *et al.* In determining whether a claim is obvious in view of the prior art, "the full field of the invention must be considered; for the person of ordinary skill is charged with knowledge of the entire body of technological literature, including that which might lead away from the claimed invention." *In re Dow Chemical Co.*, 837 F.2d 469, 473 (Fed. Cir. 1988). Thus, one of ordinary skill in the art, aware of the differences between the emissive mechanisms for fluorescent and phosphorescent emission, would not find the teachings of Hatwar regarding the emissive behavior of fluorescent materials to be predictive of the emissive behavior of phosphorescent materials such as those disclosed in Aziz *et al.* Furthermore, the teachings of Hatwar in view of Aziz *et al.* provide no reasonable expectation of success. *See In re Merck & Co., Inc.*, 800 F.2d 1091 (Fed. Cir. 1986).

Thus, for at least the preceding reasons, it is respectfully submitted that the pending claims are not rendered obvious by Hatwar and Aziz *et al.*, alone or in combination. Therefore, Applicants respectfully request that the rejection of claims 4-6, 14-16, 24-26 and 32-44 under 35 U.S.C. § 103 be withdrawn.

V. CONCLUSION

It is respectfully submitted that the claimed subject matter of the present application is patentable over the prior art and that all pending claims are in condition for allowance. Prompt reconsideration and allowance of the present application are therefore earnestly solicited.

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Respectfully submitted,

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Attachments